EXPLORATION OF RUINS IN THE WHITE MOUNTAIN APACHE INDIAN RESERVATION, ARIZONA

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HISTORY

A reconnaissance of ruins in Arizona for the Bureau of American Ethnology in 1918, an account of which is appended, led to the selection of a large, ancient pueblo in the northwestern part of the White Mountain Apache Reservation for exploration. In 1919 this ruin, called by the Apache *Nas tsuggi toeda*, Grasshopper Spring, was examined as thoroughly as the small funds permitted. Through the kindness of Mr. and Mrs. S. W. Jaques of Lakeside, Ariz., who furnished transportation to the distant site, the work was much expedited. The results of this exploration, unpublished in the expectation of further work on the ruin, are now given in their incompleteness as containing data of importance concerning this unknown region. A brief summary of the work on the project was published in the 1919 number of Smithsonian Miscellaneous Collections.[1]

Geography, Geology, and Biology.—The country west of Cibicue to Oak Creek is topographically strongly diversified, being cut with deep canyons and interspersed with high mountains and parks. West of Cibicue the rocks are limestone and sandstone of the Pennsylvania series, and these rocks prevail at Grasshopper, the limestone being highly fossiliferous. The sandstone is bright red and dividing easily into slabs of varying thickness. The walls of the ruins were built of these materials, principally of gray limestone. In several ruins of the group the central buildings were of red sandstone and the surrounding rooms of limestone, an evidence of intentional village planning.

Biology—Plants.—The country about Grasshopper Valley is forested with *Pinus ponderosa*, *Juniperus occidentalis*, cedars, walnut, oak, and a few trees of other species. The brush common to the open

[1] Volume 72, No. 1, pp. 64–66, and in Volume 70, No. 2, pp. 90–93.

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country is principally of rhus and acacia, yucca, dasylirion, agave, and other desert plants, often occurring over large areas.

Biology—Mammals.—The natural wild animals are deer, bear, wolves, fox, coyote, wildcat, raccoon, beaver, porcupine, rabbit, and smaller life. These animals are relatively abundant owing to the wildness and inaccessibility of the region, from the fact that Indians

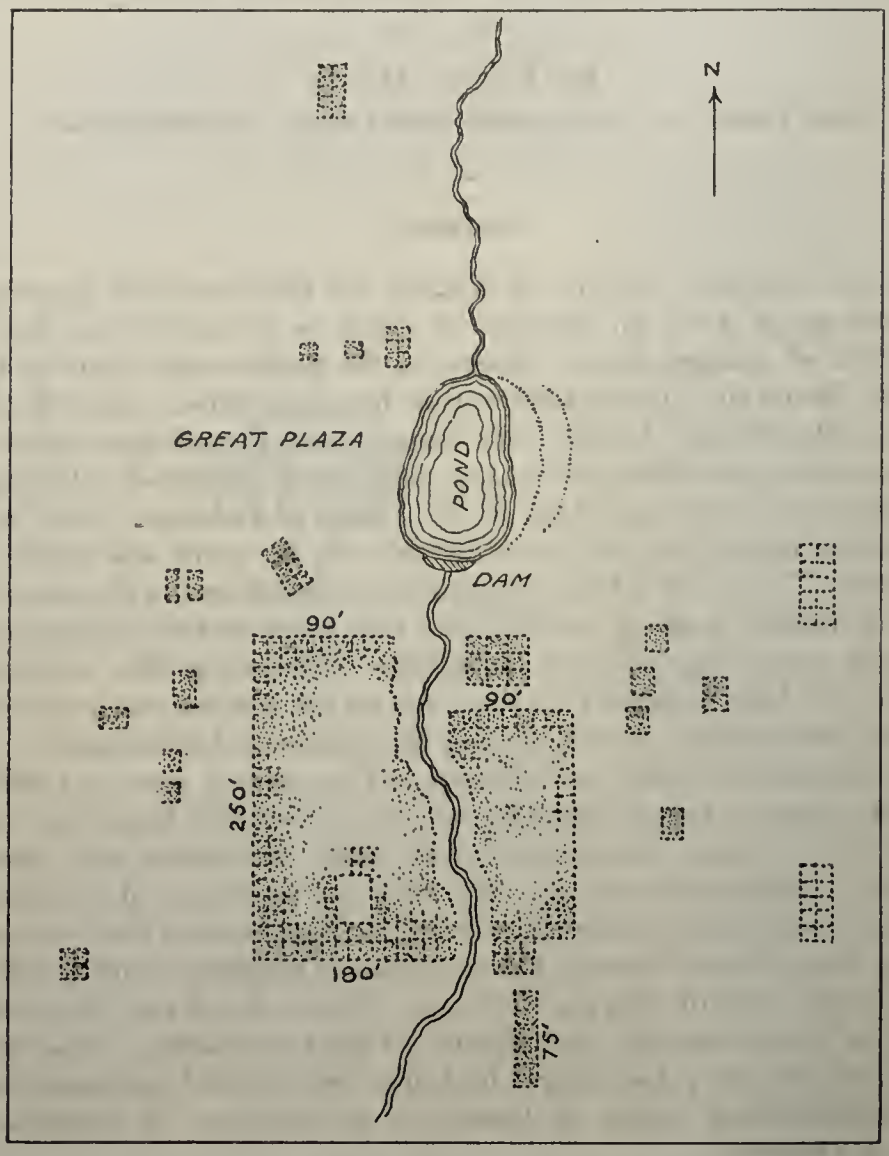


Figure 1.—General Sketch of Ruins in Group

hunted with bows and arrows, and the fortunate event that the whole territory was set apart as a reservation.

Mammal bones from the ruins and identified by Dr. Gerrit S. Miller, jr., are: Mule deer, lynx, bear, wolf, jack rabbit, and dog.

Human remains.—The cemetery areas shaded on the plan (fig. 5) yielded little material. Evidently they were mere burial plots of

the adjoining smaller houses. The larger cemetery, if it exists, was not found. The burials were at full length and not more than 40 inches deep. Only a few burials had mortuary offerings of pottery or other objects.

Dr. Ales Hrdlicka reports that the majority of the skulls are of the oblong type like those coming from the Gila. This corroborates the prevalence of Gila and other southern pottery types in the culture remains.

Birds.—There is abundance of bird life in the region. As noticed in remarks on mammals, the setting apart of the reservation has aided in their preservation. The birds generally noted are jays, large wild pigeon, plover, hawks, eagles, turkey, and quail. Bones collected in the débris of ruins and identified by Dr. A. Wetmore are the ferruginous rough legged hawk, *Triochis regalis*, the red tailed hawk, *Buteo borealis*, the turkey buzzard, and the raven, *Corvus corax*. Turkey bones were plentiful, but it is most probable that these birds were preserved for their feathers and not eaten.

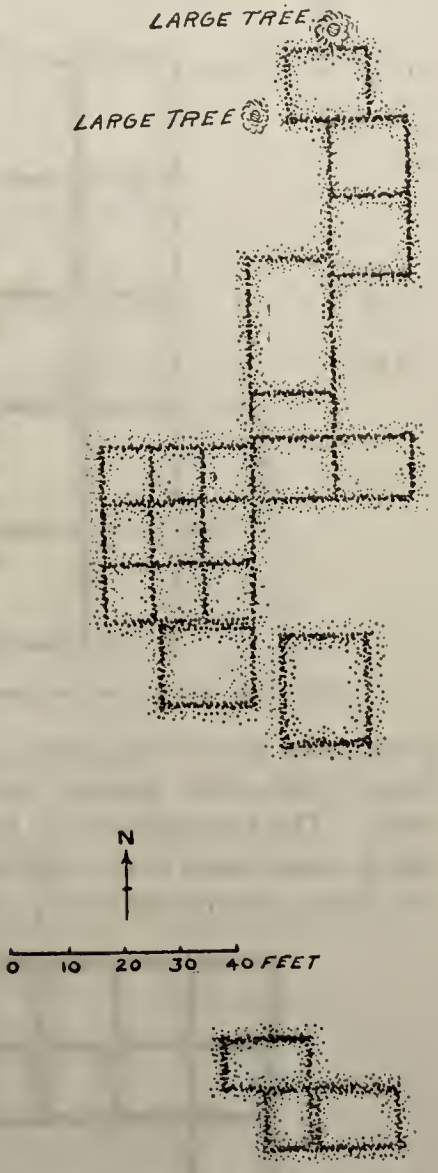


FIGURE 2.—SKETCH OF INDIVIDUAL RUIN

DESCRIPTION OF RUINS

The location of the Grasshopper sites was determined by the strong and permanent spring, the basin-like area in which water could be impounded, the excellent land available for cultivation, and the supply of wood for fuel, together with the good conditions for an abundance of game. Beams and stone for building and flint for various implements were also factors of advantage.

The Grasshopper ruins consist of a great house located near the spring and water channel, and a number of sites of the groups more or less distant. The great house is in two wards lying in compact masses on either side of the rivulet called Salt River Draw. The mounds are covered with squaw brush, and walnut, with here and there a juniper and pine (pl. 1, *b* and *c*). The chief outstanding

features of the west village is a court near the south end, 90 by 140 feet, connected with a small plaza. This ward of the village covers more than an acre and was four, perhaps five, stories in height. The east ward is more than half an acre in area. North of the west ward is a plaza 300 feet long, flanked in part on the east by an isolated clan house of 18 rooms, well planned. Six ruins in the cluster may be regarded as clan houses, sketch plans of which are figures 2–4. They differ in size and arrangement of rooms; in general they show considerable skill possessed by the architects who planned them (fig. 1).

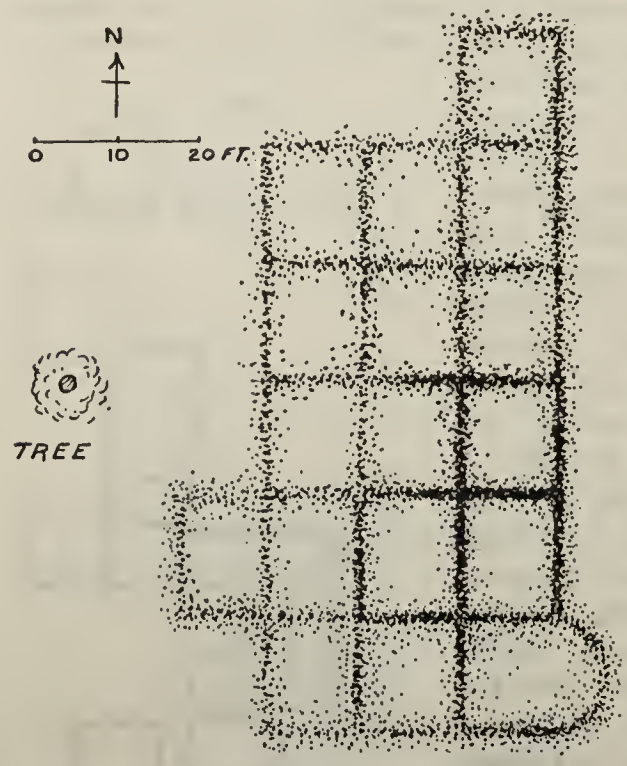


FIGURE 3.—SKETCH OF INDIVIDUAL RUIN

A third form of building consists of large rectangular areas outlined with building stones. These are seen scattered over the level ground, principally west of the great pueblo (fig. 5). Observers have called them "unfinished houses," but they are more likely the bases of sheds. The foundations are four or five courses of masonry and do not go down more than 18 inches, showing that they did not support any heavy superstructure (pl. 1*a*).

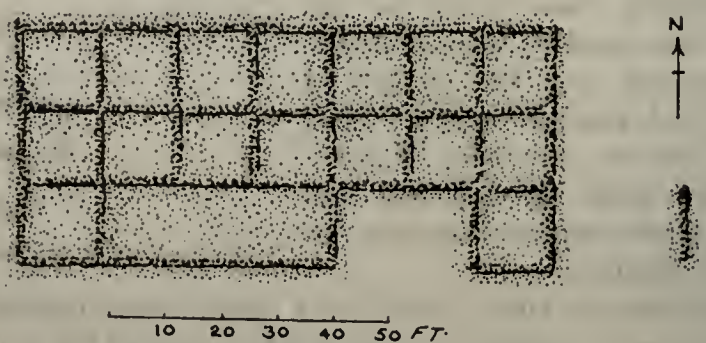


FIGURE 4.—SKETCH OF INDIVIDUAL RUIN

Two lenticular rubbish heaps lie on the open meadow 100 yards south of the walls of the large village. They are 60 by 72 feet and 4 feet high. Their presence at such a distance from the pueblo is

remarkable. Such mounds have been found in Chaco Canyon by Mr. Neil M. Judd and Dr. Frank H. H. Roberts, jr. West of the group a trench was made in débris of what appears to be a primary camp, occupied while the building of a clan house or a section of the village was being prosecuted. Another interesting feature of

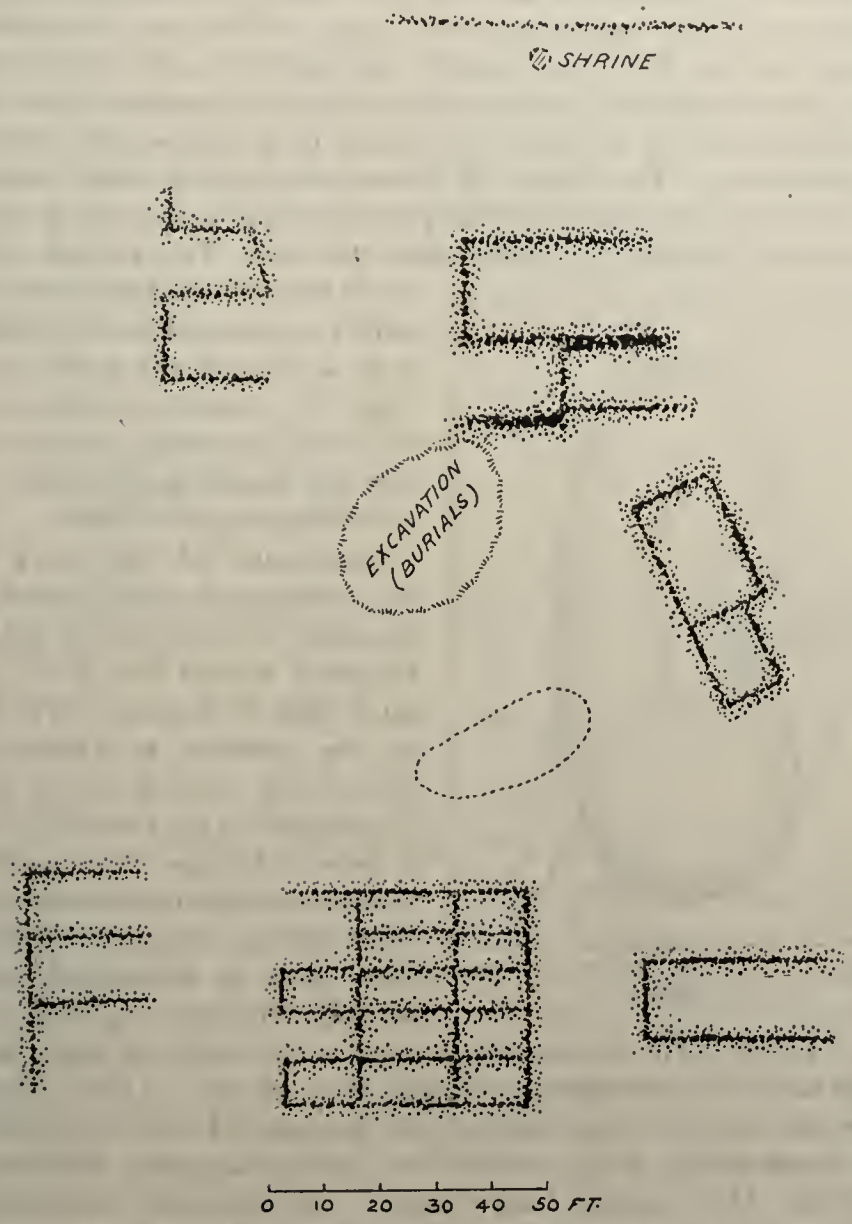


FIGURE 5.—SKETCH OF RUIN OUTLINES WEST OF GREAT PUEBLO

Pueblo engineering discovered here were retaining walls of several courses of quite large stone set on bedrock and apparently intended to counter lateral thrust of heavy masses of masonry (pl. 2, *a* and *b*). In the limited time allotted for the work many excavations were made by the Apache laborers, and several rooms cleared out with

good results as to artifacts and skeletal material. It is evident that these ruins would repay further examination, and since they represent the focussing of several cultures much could be learned as to distribution and time elements.

East of the spring and bounding that side of the valley are red bluffs covered with brush and timber. Along the bluff top are overgrown ruins that appear to be of ruder culture than those of the valley. On the level land beneath the bluff 1½ miles northeast of the spring is an oval pit 72 by 30 feet and at present 4 feet deep. At the side of the pit grows a checker bark juniper 132 inches in circumference. The débris of leaves, twigs, and fruit from the tree has filled the portion of the pit extending under its top spread. The surface drainage is away from the pit. The purpose of the pit is conjectural, but it was probably a ceremonial house connected with a ruin on the bluff near by (fig. 6). Considering the size of the slow growing juniper, this tree has stood on the side of the pit several hundred years.

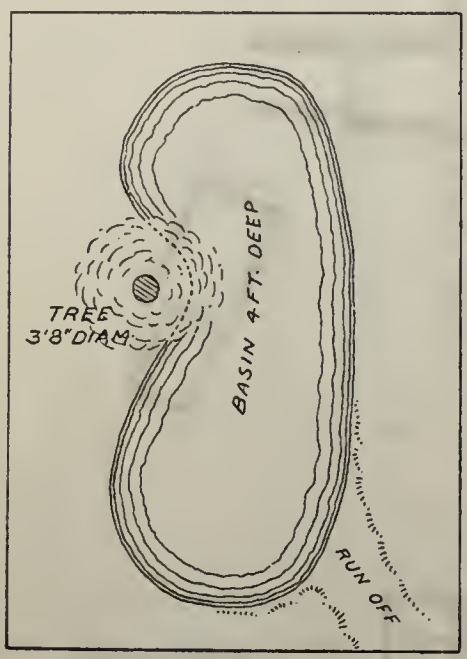


Figure 6.—Ceremonial Pit With Juniper Tree

Connection of this work with the rectangular stone walled kiva described by the writer in 1914 and the earth walled kiva of the Luna pit village is assumed. The kivas in the pueblos at Grasshopper were house room kivas, as shown by excavation in a room in which a decorated stone slab was found.

As is commonly observed in the surroundings of ruins, the immediate area is deforested due to activities in building and collection of fuel. The return of growths is an index of more or less importance in determining the age of a pueblo. At Grasshopper there has been a return around the margins of timber stands, but the meadow-like land around the pueblo appears sterilized to growths. One checker bark juniper 166 inches in circumference offers an interesting question. This tree stands near the border of the plaza west of the main ruin. The question is: Was this tree several hundred years old preserved by the Indians or has it grown since the decay of the pueblo? It is observed that this tree grows in the limestone outcrop and not in house débris, which probably accounts for its preservation.

Cliff dwelling.—During the exploration at Grasshopper a cliff dwelling in a lateral of Oak Creek, about 8 miles away, was examined. The ruin is picturesquely located under a great overhang of ribbed red sandstone conglomerate bedded with shale in a narrow canyon (pl. 3, figs. *a* and *b*). It is called by the Apache *Chidische*, red rock house, and sometimes *Tse a ke nastle*, house under the cliff.

The bow of the cliff back admitted in one place the building of three rooms deep and the adjoining structure two rooms deep. Along the front is a line of rooms now in ruins while the main three and two story building, probably the first erected, still stands. It is evident the front rooms represent later and poorer construction, as may be seen in the abutting of the walls against the face of the older building without bond (pl. 4, fig. *a*). There were three stages in the cliff dwelling, the dwellings in the deep bow in the rock face

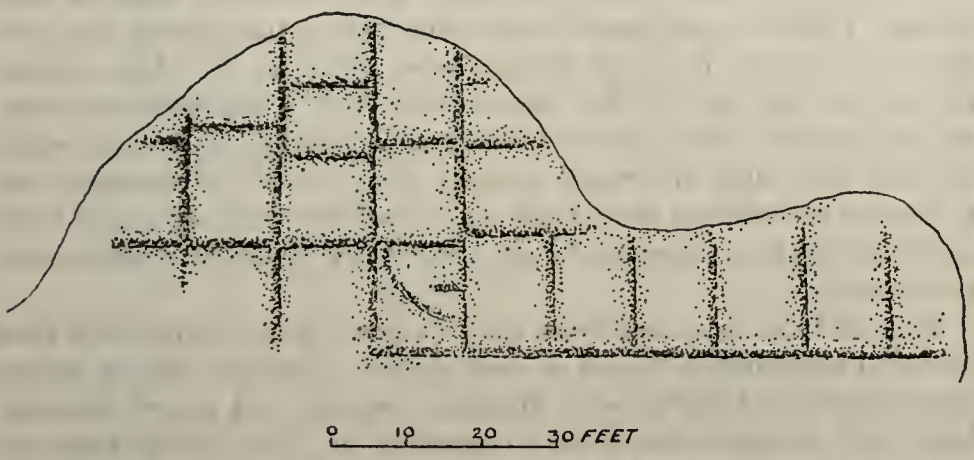


FIGURE 7.—PLAN OF CLIFF HOUSE, OAK CREEK

being the earlier. So far as now can be made out no change in culture accompanied the different periods of building.

The ground plan shows 24 rooms and the superposed rooms bring the count to 32, approximately (fig. 7). One room about the middle of the plan shows a curved wall of an older building (pl. 6*a*). Another room is built in a cavity on the ground plan and is like a basement. It has no débris on its floor of stone and is much blacked with smoke. It is entered by an opening in the room in the second story and by a hatchway from the room above.

Doors in this ruin are plain low openings not partially walled in below as in Mesa Verde (pls. 4*b* and 6*b*). The step is a larger stone much worn, and the lintel is three oak poles. One window in the upper room of the high house is in all intents like a door. The roofs and floors are of beams, poles, split cedar strips, and mud (pl. 5*a*). The beams are of juniper; one beam lying in the ruins of one of the

front rooms is 12 feet long and 8 inches in diameter, burnt and cut at the ends. A modern ax cut has subsequently been made near the middle. Some of the walls are still plastered, the mud laid on roughly bearing finger impressions.

The lower room in the high house has a ceiling of 8 poles on two beams. The filling between the poles is of rather regular lath riven from cedar laid in neat order. The upper room is entered by a hatchway two poles wide lined with flat stone laid up in several courses. This room is in two sections without partitions, the back room floor being slightly higher and covered with clay about 5 inches thick. Near the hatchway is an ovate fireplace of mud 15 inches in diameter and 24 inches over all. The grinding stones remain on the floor. This room is the largest in the cliff house, has no débris, and appears to be in the same condition as when it was occupied (pl. 5*b*).

A storage room on the ground floor still contains a mass of corn stalks. Other inside rooms have much débris that yields few artifacts of interest, the ruin having been searched by white visitors in the past and not by the Apache, who have a superstitious dread of such places. My Apache workmen, induced by duty and wages to visit the ruin, afterward purged their bodies of assumed evil influences by rubbing their arms and chests with sundry green herbs growing nearby. Needless to say, their work in the ruin was merely perfunctory.

The artifacts recovered from the cliff house débris differ little from material customarily found in such places. Slender cobs of 10-row corn, husks, and stalks were frequent; squash and gourd common; bows and arrows; fire sticks; cigarettes or pipes made from the pedicel of the corn ear; twisted branch ties; twilled basketry of yucca, not coiled; cloth, coarse and finer; cord, yellow and red wound on a slender rod; portion of a cord fringe skirt; and pieces of worked wood tablets comprise the list of such objects. The hafted stone blade, which is a unique specimen, shown on Plate 7, was found in this cliff dwelling by Mrs. B. A. Jaques of Lakeside, Ariz.

The hafting of this blade is accomplished by splitting a section of a wooden stem, placing the ends on either side of the stone blade, and securing the ends tightly with a wrapping of yucca fiber. In this way the blade is tightly clamped between the strips and so remain to this day. This simple method of hafting is rarely seen, and so far as known the specimen is unique in North America. Mr. H. W. Krieger has obtained this method in Santo Domingo. The finding of the hafted blade illuminates the use of the many thin basalt blades found on the Blue and San Francisco Rivers.[2]

[2] Bull. 87, U. S. Nat. Mus., 1914, pl. 4, fig. 1.

A ruin on a hill top 2½ miles northwest of Grasshopper pueblo is a major work and is interesting in the conformation to the area (fig. 8). This ruin appears to be older than the great ruin and

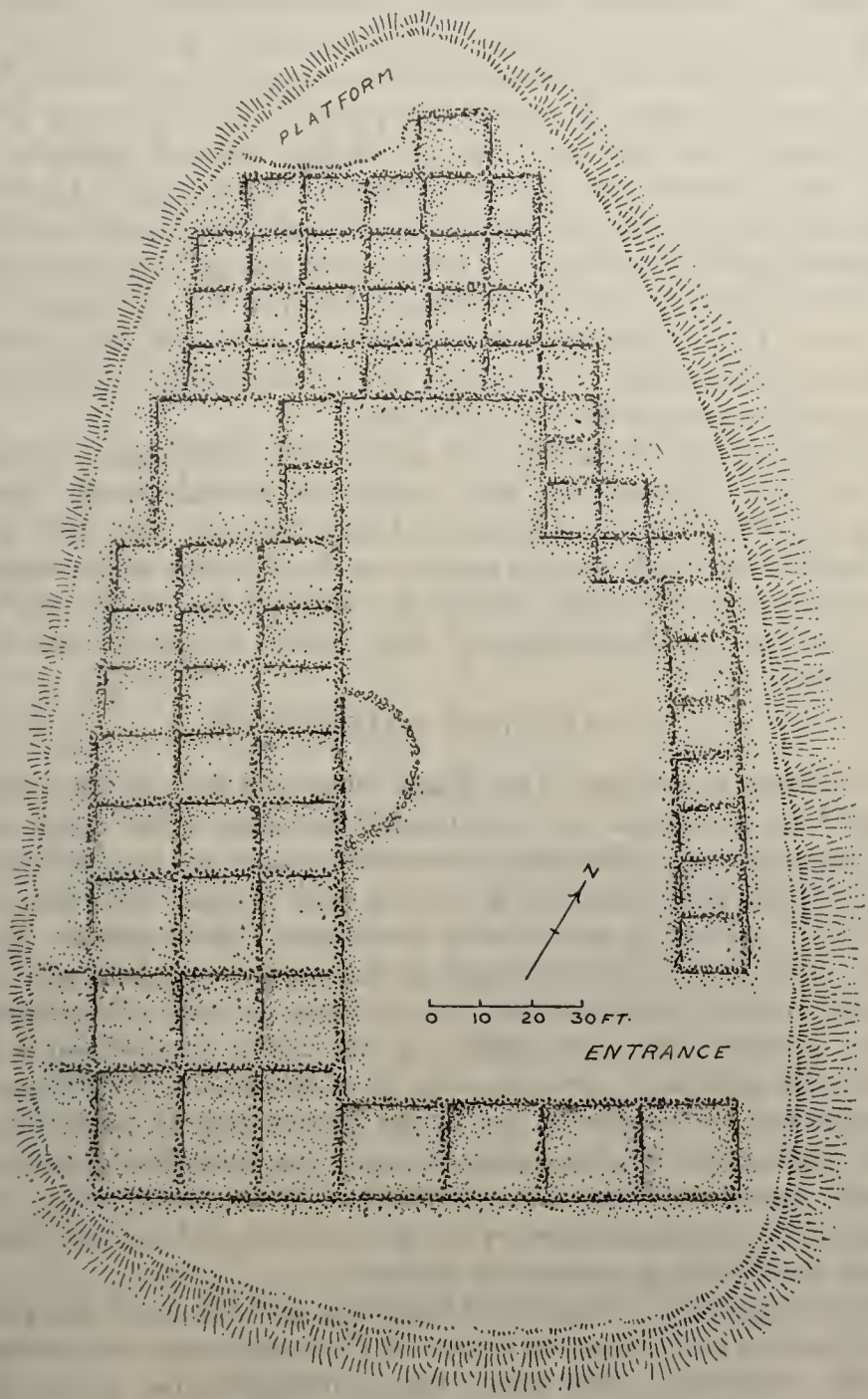


FIGURE 8.—PLAN OF HILL TOP RUIN

may have been abandoned during the gray and red ware period. There is plain evidence of long continued occupation in the great amount of débris covering the sides of the hill and in the different

phases of construction of the buildings. Large pines and oaks grow on the house ruins, showing that the forest has long reclaimed the site.

The plaza is 80 by 100 feet with an extension on the northwest end of 40 feet into the house mass at the northwest end. On the west side of the plaza is a high bank of house remains 60 feet wide with back along the edge of the hill. On the east side is a row of one story houses flanking the plaza and closing the east border of the hill. The entrance, 24 feet wide, is at the east point. Across the southeast end of the plaza are four unusually large rooms abutting against the west house mass. On the north, rooms begin to jut in on the plaza and coalesce with the houses covering the northwest end of the site. This collection of houses extends 100 feet to the northeast from the front break in the plaza and terminates in a platform of unknown purpose at the top of the hill.

A corral 21 by 24 feet is built against the west houses, probably by intruders. Among the west houses are several Apache graves. At present 60 rooms may be counted, and these are unusually large. Estimating the high western portion at three stories would augment the number considerably. Under the edge of the hill on the west side are traces of foundations of other houses overgrown with large junipers.

FIELD NOTES—GRASSHOPPER

Trenching was begun in the plaza, 80 by 120 feet, in the southern part of the great ruin and a section 30 feet long, 5 feet wide, and 6 feet deep was cut. The level plaza was recently made into a garden by the residents of the ranch who led a ditch in from the pond. The cultivated surface is strewn with flint flakes and fragments of pottery. The trench showed black packed soil for 2 feet and earth getting redder to the bottom. At 18 inches a band of charcoal of burnt corncobs, etc., was found; at 46 inches another band with ashes and reddened earth showing in a fireplace. No burials are encountered in the débris, but in the bottom tightly packed in the clay was the burial of a young person. No skull found, only arm bones, shoulder blades, and vertebrae. With these was a rude spheroid, corrugated vessel with broken rim and a disk from a rough vessel (fig. 9, section of trench).

A trench on the north side of the plaza near the buildings yielded three burials and no pottery. One of the burials was on a pavement of flat sandstone. The bones were too fragile for preservation. Further trenching brought to light many burials of adults and some pottery. Often burials of children in a bowl. Frequently no pottery with burials. Fireplace boxed in with slabs at the 36-inch level and much ashes.

The percentages of pottery fragments in the plaza were: red, 50; gray, 40; yellowish, 10; with corrugated omitted.

On the north side of the plaza 11 feet, of what is evidently a retaining wall, was uncovered. This wall, of heavy stones, is in four courses bedded on a red sandstone mass and on shale. This wall is 7 feet from the dwellings. It was built to hold this section of the pueblo at a point where in wet seasons the earth would have a tendency to slip. Several of these walls were unearthed. This feature is new in pueblo engineering (pl. 2, figs. *a* and *b*).

Began excavation of a room on the northwest corner of the plaza on the entry passage to the town. The room measures 11 feet by 11 feet, 8 inches, the north wall having 20 courses and the east 21. The north wall of very good masonry chinked with small tablets of stone. The door in the east wall is 28 inches square and there is a small opening in the south wall. Other walls inferior masonry (pl. 8, *a* and *b*).

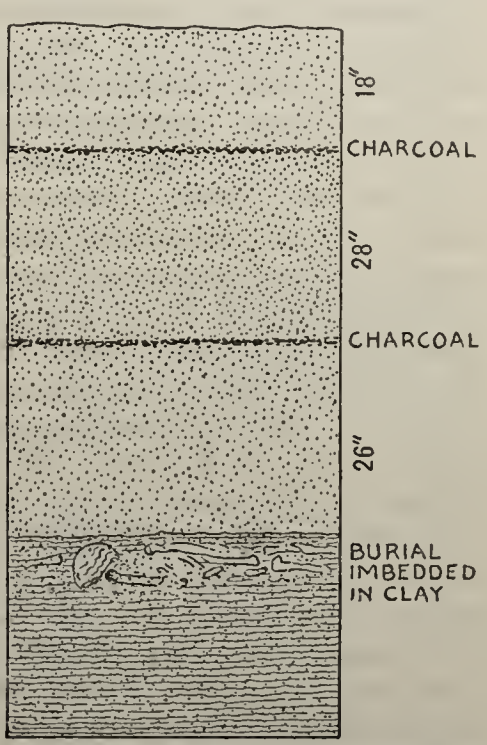


FIGURE 9.—SECTION OF PLAZA IN GREAT RUIN

Great number of flint flakes in the room débris, all suitable for cutting or scraping and many rechipped or otherwise worked.

A census of the artifacts from this room follows: 3 metates, 10 handstones, 20 hammers, polishing stones, iron and copper paint, flakes, flake knives, hoes, arrowheads, drills, disk, bone awls, picks, punches of antler, rings, cut bones, marked bones, animal bones, shell fragments, spindle whorls, spoons, worked pottery, handles, shards in order of frequency—1, red; 2, corrugated; 3, white; 4, various; charcoal, ashes (no beams).

Excavation on the east side of the passageway uncovered a fireplace with small rocks burnt black. Near this was a burial of an infant without offering. The child was very small, only the skull plates remaining.

Trenched on the south side of two low mounds 60 by 72 feet diameter and 4 feet high. These mounds are about 132 feet between centers and lie south 252 feet from the rear wall of the great pueblo west of the draw. Soil deepens toward the center about one inch to the foot. Soft, loose débris, with charcoal, ashes, flint chips,

shards, etc., but no burials in the 14-foot square area excavated. These mounds are evidently places of deposit of house refuse, nearly one-tenth of an acre being covered with a lens of débris 45 inches deep in middle and nearly a hundred yards from the pueblo.

Pottery percentages: Gray, 12; rough brown, 29; red, white line, 48; gila type, 8; and yellow shades, 2.

Near the center of one of the mounds is a fire seam with ashes and burnt rocks 20 inches from the surface and 20 inches from base. The center area seems to go down deep. Possibly excavation here would show a pit basin like those in Luna, N. Mex., and at Interior Sawmill (pl. 10*a*) on this reservation; mound has been worked over by ground animals.

Surface of runnels east of the great pueblo contains many shards washed out over the flat. Made a hole 11 feet square and 2 to 4 feet deep in house debris east of entrance to pueblo on east side but found no burials. Approached the walls of the presumptive watch room at entrance of main pueblo. Soil not good.

Opened large trench in the gently sloping area extending 250 feet north of great pueblo and found one or two burials, and animal bones in débris from 30 to 40 inches deep to hardpan.

Surface ruins to west of main pueblo show as rectangles of limestone imbedded in the ground. In the house débris several burials, both near the surface and on hardpan, recumbent and flexed. Skulls except one show occipital deformation. Pottery shards vary from crude to fine. Red with black outlined with white; white; white surfaced, green decoration in glaze; black and white; red brown "pebbled" surfaced with white line decoration with polished black interior. Fragments of axes, arrow polishers, awls, drilled antler sections, arrowheads, etc. Soil 30 to 45 inches thick.

Trenched along walls of outlined or "unfinished" houses on flat area west of pueblo. Found that walls are laid on older house refuse deposits. Four courses of masonry were seen. There is no evidence of character of superstructure. Trench east of a pueblo lying north of the large group shows little decorated pottery, but brown with black polished interior prevails. Perhaps residuum of an older clan. Earth 40 inches deep, 15 feet from wall. Retaining walls found in this trench.

Percentage of shard types from trench 16, west side of east pueblo: Red, 33; gray, 18; brown, 11; rugose, 26; yellow brown, 2; Gila, 4; and yellow, 4. Most of the shards in the upper foot.

Trenched a lens of house refuse 200 yards west of the large pueblo showing as a slight elevation found to be 1 foot thick. Contains a fair amount of shards, not much flint, a few worked bones, and very few animal bones. The shards show thick coat of lime deposit. This site appears to be a temporary camp occupied while the pueblo was

being built. Shard percentages are: Gray, 20; red, 10; polished brown, 20; rugose, thick, 50.

Opened up a room in northeast corner of great plaza. Not many shards; soil pretty clean and in parts curiously stratified as though deposited in water. Many well-squared building stones in the soil. West wall crudely laid up. Large fragments of red ware and much ashes on floor. Indications that the building was 4 or 5 stories at the point. Percentages of pottery: Red, 70; gray, 17; Gila, 4; brown, 9; with much rugose ware.

Opened up a long wall of a large room in a high part of the west pueblo. Masonry very good, stone faces seamed and cracked, one stone with scorings. (See pl. 8.) This room probably ceremonial. Another near-by room has a screen of loose stones added for partition. In the room nine beaming tools of deer pelvis, many jaws and other bones of deer, two large axes, and a painted circular stone tablet were found. Pottery, red predominating. In the room were two fireplaces, one boxed with slabs.

ARTIFACTS

Stone.—Stone artifacts are not plentiful at Grasshopper as the ruin has for a number of years been near a trading post and the Indians have gleaned the surface. The Apache still make bows, arrows, and quivers, these salable articles bringing in some monetary return. For this purpose arrowheads and flint flakes are picked up sedulously and worked over to point the arrow shafts. On several occasions the writer has watched Indians chip arrowheads, the chipping now being performed with a knife blade.

The débris here is sown with smooth gray chips of flint derived from outcrops of beds in the limestone and excellent material for the aboriginal lapidary. Arrowheads found are slender and well made or gross and poorly made. The slender points are of the swallowtail type. Rarely are nocks observed, indicating that the points were set on the shafts with gum, a common practice still with the Apache and of other tribes who lived in the region. Knives of medium size; ovate, flat, thin scrapers; drills, some long and finely chipped; and some with spatulate finger grip, differ in slight degree from those generally found in Pueblo sites. Pillow-shape rubbing stones, metates, and manos are relatively frequent. Smoothing stones or pottery polishers are found. One smoothing stone of jade green translucent steatite, a material occurring in Oak Creek canyon, was taken from an excavation. Grooved arrowshaft smoothing stones are in the material found. Axes are of two sizes: A large wedge shape with single interrupted groove 9¾ inches long, 2¼ inches thick, 3 inches wide (24.5 cm. long and 9 cm. wide), weight 5 pounds,

and small more flattened specimens grooved in a similar way. A small and a large bilobed chipped ax were recovered. Hoes are represented by a spall of limestone, chipped and broad in front and tapering toward the back.

Pipes.—Short tubular pipes of soft stone were made at Grasshopper. The simpler form is a truncated cone of polished black steatite. A larger has the exterior of the bowl roughened as though to imitate a corncob. A third, of polished black stone, has a small projection at one side by which the pipe was held. A specimen found in a cave on Oak Creek is of the fine-mottled sea-green steatite mentioned. This pipe, the property of Mrs. B. A. Jaques, was taken from this cave, where it had likely been offered. The Apache Indian who found it fled because he "heard voices." It is of the uncommon type of the small pipe (pl. 9, figs. *a–d*). The projection slants upward. The workmanship of this pipe is excellent.

A circular slab of sandstone having a projection and with traces of a painted design and circular hole 2 inches in diameter in the middle was found in a room south of the entrance passageway to the main ruin. With it was found a large ax and a gray water vase. This stone appears to be ceremonial, representing the sipapu or entrance to the spiritual underworld. Several stones of this character have been found in ancient pueblos.

Masses of red-paint stone were taken from excavations in rooms.

The rarity of beads in this ruin is remarked. A few large beads of black steatite occur and fragments of shell armlets were taken from the débris. A few olivella shells were seen, also small carvings of black steatite probably intended for necklace ornaments.

There was no lack of bones of animals in the débris at Grasshopper, showing that there was abundance of game here at the time of occupation, principally deer, and a fair amount of bird bones, mostly turkey. Worked bones are numerous and consist of long bones from which sections have been cut, rings, tubes, awls, antler tips. There is little engraving of parallel lines on awls. Nine deer-pelvis scrapers were found together in a room. The bone art differs little from that figured in other reports and no new types are noted.

Gray ware.—Typical gray or black and white ware referable to the San Juan pottery of Kidder penetrated only sporadically below the escarpment from which spring the Salt and Gila Rivers, usually on the upper reaches of these streams. Of these sites Forestdale is predominantly a gray site as is Blue, though in less degree. At Grasshopper gray is in appreciable amount, the excavation count giving 22 per cent. Whole specimens in burials are very few.

Black-on-white ware, together with the same type in red, occur in some amount at Grasshopper as the shard percentages in the excava-

tion pits show. As stated, no stratification evidence was found to show that the ware was older than other types in the ruins. The presumption is that the black on white came into the Grasshopper complex as a remnant of the original wave from the San Juan and was perpetuated by some surviving clan. The occurrence of the black on white in localities far from the original seat forms an interesting problem of distribution which must seriously be taken up by the student. In general, the ware from its material and the persistence of its designs affords a good basis for the study. It may be remarked that the highest class of this ware has a pure kaolin paste not requiring surface treatment with white. This class, on account of geological environment as to clay, is rare in most parts of the region. Where impure kaolinic clays occur without ochers and burn to a dark gray, a wash of white was used and infrequently red. Where black on white was to be produced with common clay with ochers in their composition, a wash of white clay was needed. In this way ware equivalent to the type black and white could be made for customary tribal usage in any part of the Southwest. It is evident that migrants from the black-on-white centers pursued this course because of the persistence of the designs on inferior paste found in various parts of the terrane. Black-on-white ware is particularly interesting in marking out the earliest migrations in the Pueblo region.

The geological environment is also responsible for the first ware made in the Pueblo region, as shown by the collection of Doctor Roberts from a late Basket Maker[3] in Chaco Canyon. This ware is evidently the initial effort in the black on white series in which the ground is generally undecorated as in a normal first stage in ceramic technology.

The forms of the ware at Grasshopper are large, flat-globose water vessels, bowls with straight rims, and small pieces of various forms. In general the designs show solid with hatched drawings characteristic of the ware, but there are often modifications to be expected from the distance from the source and local conditions. In this respect there may be mentioned the conventional treatments of plumage as squares with a spot in the middle or trapezoids with the spot, the hourglass shape bird forms, and the inclusion of an eye in the solid black design indicating an animal. In these instances the design is less pure than that of northern specimens or even of Forestdale and the upper Tularosa. An interesting specimen of water jar, 14 inches (36 cm.) in diameter and 10 inches (25.5 cm.) high, was recovered in fragmentary condition. The paste is homogeneous gray but has been slipped. The decoration is in geometric

[3] Bull. 92, Bur. Amer. Ethnol., 1929, pp. 108, 109.

bird design, plumage feathers represented by diamonds with dots in the center, pinions by parallel lines. The head is a long wedge with a white dotted eye.

Gila ware.—Gila ware is characterized by soft paste of red brown colors slipped with cream white over portions of the area and decorated in black. Peculiar also to Gila ware is the incorporation of undecorated areas in the patterns and the use of bright red pigment producing polychrome effects. The designs are never outlined with the white or color.

In typical Gila ware centered in the upper valley there is never any exterior rim decoration on bowls. Variation from the type in locations where Gila ware has spread sometimes show rim patterns. One such specimen was found at Grasshopper. The interior decoration of bowls is based on 4 arranged in a band, leaving a quadrangular area in the bottom. A characteristic is the incorporation in the design of large circular areas in white with a black spot in the center. Symbolic elements diffused through Pueblo art are utilized, but in a less informed fashion. Technically also less skill in drawing and composition are evidenced or conversely we have a style in which these elements are consonant. Nature and life design elements are used principally in combination, very rarely as separate entities. It may be said also that this characterized a rather primitive stage of art and it may be possible to place the Gila art at an earlier period than that of the Little Colorado valley, a supposition I would favor. Further, the affiliation of Gila ceramics is with that of some of the Rio Grande pueblos, specifically, Santo Domingo, Santa Clara, Tesuque, and other Tewa pueblos where partial application of thick slip and black decoration is common technique. A portion of Zuni ware shows the influence of Gila technique.

Forms of Gila ware are limited, bowls usually, some vases and large ollas, and occasionally figurines. The bowls are almost always incurved and the exterior unpolished.

At Grasshopper Gila ware removed whole or mendable comprised 3 bowls and 12 large fragments. Its occurrence in the pits was 8 per cent.

Chevlon ware.—This is so named from the type locality near Winslow Ariz., worked by Dr. J. Walter Fewkes and the writer in 1897, is strictly in the red ware class. It belongs to the variety having a red wash on a black and white ware paste base. This variety is the first color variant observed in the San Juan region and accompanying the black and white in such sites. This red appears to be the first of its kind and is contemporaneous with the black and white. Very early in the pottery art among the Pueblos it was found necessary to wash or slip the surface of ware where paste lacked ocher, therefore burning dark gray. Few kaolinic clays burning

white were to be had and the Pueblo potters hit upon the wash of pure kaolin to produce the effect. Similarly they discovered the red wash of iron ocher. Numerous tribes the world over had not advanced to this phase of the art. Partial slipping is seen in Rio Grande pottery and some Zuni varieties. Absence of slip is seen in Mohave, some Pima, Diegueno and other southern California tribes, and most of the remaining United States. In the ceramic art in general the use of slip has no especial classificatory value, but only bears on the progress in the art. The use of slip also indicates the need of a uniform background on ware intended to be decorated as well as the desire for a uniform color.

Chevlon ware possesses as strongly marked characteristics as any other Pueblo pottery, and for this reason its occurrence in other sites is a valuable clew to distribution. This ware may be expected to occur in varying percentage in sites on or south of the Little Colorado River, larger in sites from 35 miles south of the river to the north front of the White and Mogollon ranges. Thus we find at Chavez Pass and Pinedale much Chevlon ware associated with yellow and red brown also at Four Mile and other sites in the Taylor region. Here and there in sites east of Winslow to the Petrified Forest pieces occur. Apparently none of the type is represented in ancient Zuni ware. Homolobi, a short distance from Chevlon on the north bank of the Little Colorado, shows a very small percentage. Homolobi has yielded a great quantity of transitional Hopi ceramics and it is probable that this ruin and Chevlon were not contemporaneous. The distribution of Chevlon ware south of the great natural geographical obstacle of mountain and escarpment is quite limited, more specimens being found at Grasshopper than in any other sites examined below the "Rim."

The principal forms of Chevlon ware are bowls, pots, and vases, marked as mentioned with strong tribal characteristics of art. Bowls are incurved with ample rounded sides and well proportioned in the ratio of height to diameter. Pots are spherical with outcurving or straight rims. Vases are in general turnip shape with straight collar.

The decoration of Chevlon ware was laid on with a dense lustrous black and kaolin. It is evident also that the ware was subjected to hard firing. In the decoration the black preponderates and is outlined and otherwise set off by the kaolin, giving a striking contrast. Sometimes the black is appliquéd in small dots on the kaolin.

The decorative designs of Chevlon ware have not reached the stage of geometrization observed in most Pueblo wares. The patterns lie between the conventional and realistic. The fundamental base of four is generally not as an axis for the arrangement of designs.

This sets apart Chevlon ware and suggests a modernization and freeing of decorative art as observed at Acoma though not to the same extent. In Acoma decoration few of the customary Pueblo symbols are recognizable; in the Chevlon ware many of the symbols are present though handled in the free manner observed in the Little Colorado region. Especial interest is centered on the volute prominent in Chevlon design. This figure first appears prominently in the pure gray ware period and so far as known is one of the earliest motives in Pueblo ceramic decoration.

As a bird symbolic convention, it is the most widespread of all Pueblo design. It was freely incorporated in geometric and curvilinear bands or edgings. In areal treatment it formed the central key to the bird figure representing the head. Chevlon ware employs the large whorl as a separate unit design while the northern white on black ware whorl is a continuous line repeat or rarely a disconnected spiral.

In the use of a free field, for example in bowls, the Chevlon potters achieved remarkable artistic results. The bold exotic decoration is striking. The fortifying of the design at appropriate places with white is done in a masterly manner. Exterior rim decorations of the ware are usually linear, white lines being decorated with applied black dots.

Some realistic figures occur rather frequently in Chevlon red ware. Specimens found at Homolobi and Four Mile by Dr. J. W. Fewkes and the writer show a remarkable conception and execution of these figures.[4] A specimen of unmistakable importance not figured from Chevlon shows two serpents with geometric patterns on the body suggestive of the Mimbres, arranged as on the Mexican calendar stone.

Red ware.—At Grasshopper ruin, red ware is comparatively common among the potsherds in the débris. Complete specimens recovered are deep bowls of soft paste, intense red in color, no ornamentation on the exterior, and with decoration in black on the interior. On account of the fragile paste this pottery is not often recovered in excavations, and for this reason its prevalence in some southern ruins is lost sight of. The collections of pot hunters who save only entire specimens, in most cases, do not represent the types found in certain ruins. Personal observation on the Delgar ruin on the Tularosa, classed by recovered artifacts as a typical gray ware site, led the writer to the conclusion that soft red ware existed in equal amounts with the gray. The ware was encountered by the untrained excavators, but was found in nearly all cases to be in small pieces and was not collected. A census of the shards turned up in the excavations, not from the surface, has been pursued by the writer

[4] 22d Ann. Rep., Bur. Amer. Ethnol., pt. 1, 1904, pls. 24, 25.

for many years as the best method of ascertaining the ceramic index of an ancient ruin. The association of the red with the gray is normal, as on the San Juan, but there is reason to believe that in the Concho region there exist sites in which soft red only occurs with coiled ware.

The designs in the interior of soft red bowls follow the San Juan tradition and show none of the divergences of design characteristic of the region south of the little Colorado. This is evidence of an older stratum of design.

A rare type of brown ware with unusual surface decoration is found very sparingly at Grasshopper. Its position among ancient Pueblo ceramics is at present uncertain. The decoration noted on a red-brown bowl with polished black interior and slightly rugose exterior is in chevrons bordered by white lines and tinted in soft chocolate brown color. The effect is highly artistic. The affiliation of this ware appears to be with the decoration-on-coil ware found mostly in the high mountain ruins as at Linden, Arizona, and sometimes in ruins in the Little Colorado valley as at Four Mile and the Petrified Forest. It is interesting in showing the application of basket patterns to coiled ware in pigment instead of indented or scratched patterns on the coil. It is observed that in the period of elaboration of ceramic art in the area south of the Little Colorado pieces of noteworthy excellence were produced that place themselves outside the classes of ceramics influenced by conventional tribal standards of art. As a suggestion the ware described may come under this head.

A specimen, evidently sporadic, consists of a bottle form of thin brown undecorated ware, and was found at Grasshopper. The specimen relates itself to the ware characterizing a wide belt from southern California eastward to the Pima. This specimen would seem anomalous at Grasshopper were it not from the circumstance that the writer observed two sites north of the Sierra Anchas covered with surface fragments of plain thin brown. Mr. Earl Morris is authority for the statement that a number of other sites of this character are found in this region. The group responsible for the ware is conjectural, but if decorated specimens are recoverable, as seems likely, this point may be cleared up.

Coiled ware.—At Grasshopper this is in most instances rude in form and technique. In a site yielding so many types of pottery, none apparently indigenous, this is to be expected. There is no clear cut coiling, the ridges and indentations being partially smoothed, a feature common in mountain ruins. Some specimens of very delicate coiling were found, but these probably came from some other workshop.

In the ruin there is a complete absence of the brown ware with polished black interior so common at Blue and entering prominently

in the ceramics of sites north of the mountains as at Four Mile and Eldon Pueblo.

Varicolored wares are well represented by fragments at Grasshopper. No specimens found with burials would indicate that the shards are relics of the latest occupants of the pueblo. Also the distribution of the shards is greatest to the east of the main ruin in a swale scoured by surplus water. The colors are brown, red brown, deep buff, and cream with varying designs. Polychrome ware is on buff, the black designs having red additions. One fragment of a bowl of light color paste has red exterior and black line decoration outlined with white. The interior is buff with black hachure and red lines are the background. One specimen is decorated with red mat and greenish lead glaze. A few shards of this class were seen.

NOTES ON APACHE INDIANS

The present inhabitants of this region, occupying it long after the pueblos were abandoned, are the White Mountain Apaches. These Indians show little white mixture, but the present group is a medley of remnants of other Apache tribes that have not survived the violent contacts of a former period.

The population in 1919 showed an increase from 1918 of 8. The population in 1929 was 2,648 and the decrease from 1928 was 8. Unless the benefits of modern healing and sanitation which have been introduced by the Indian Office are successful, the White Mountain Apache are doomed to extinction. The Apache generally are quite conservative and have been slow to take advantage of the betterments offered them. On the material side, however, the Apache have made great strides, adopting banking, costume, wagons, harness, canned goods, and many other things from the white man.

In housing, so far they maintain the earth floor, dome-shape lodge whose structure is hidden by the masses of bear grass that cover it (pl. 10, fig. *b*). Its affinity with the Navaho hogan is seen in the vestibule. These houses are dark and unsanitary. Whenever there are several houses forming a diffused cluster, open air arbors or *ramadas* of southern origin appear (pl. 10, fig. *c*). These are assembly places and furnish a grateful shade where various work may be carried on. For a number of years the Apache have been encouraged to build houses of modern style, but probably on account of the objection of the women there have been no results.

The White Mountain Apache rank high in intelligence, take kindly to education, are alert in business, and are first-class workers. Hundreds of miles of good roads have replaced the trails over the reservation and these were built by the Apache.

a

b

c

WHITE MOUNTAIN APACHE INDIAN RESERVATION

FOR EXPLANATION OF PLATE SEE PAGES 3, 4.

a

b

WHITE MOUNTAIN APACHE INDIAN RESERVATION

FOR EXPLANATION OF PLATE SEE PAGES 5, 11.

a

b

WHITE MOUNTAIN APACHE INDIAN RESERVATION

FOR EXPLANATION OF PLATE SEE PAGE 7.

a

b

WHITE MOUNTAIN APACHE INDIAN RESERVATION

FOR EXPLANATION OF PLATE SEE PAGE 7.

a

b

WHITE MOUNTAIN APACHE INDIAN RESERVATION

FOR EXPLANATION OF PLATE SEE PAGES 7, 8.

a

b

WHITE MOUNTAIN APACHE INDIAN RESERVATION

FOR EXPLANATION OF PLATE SEE PAGE 7.

HAFTED STONE BLADE FROM THE CLIFF HOUSE, WHITE MOUNTAIN APACHE INDIAN RESERVATION

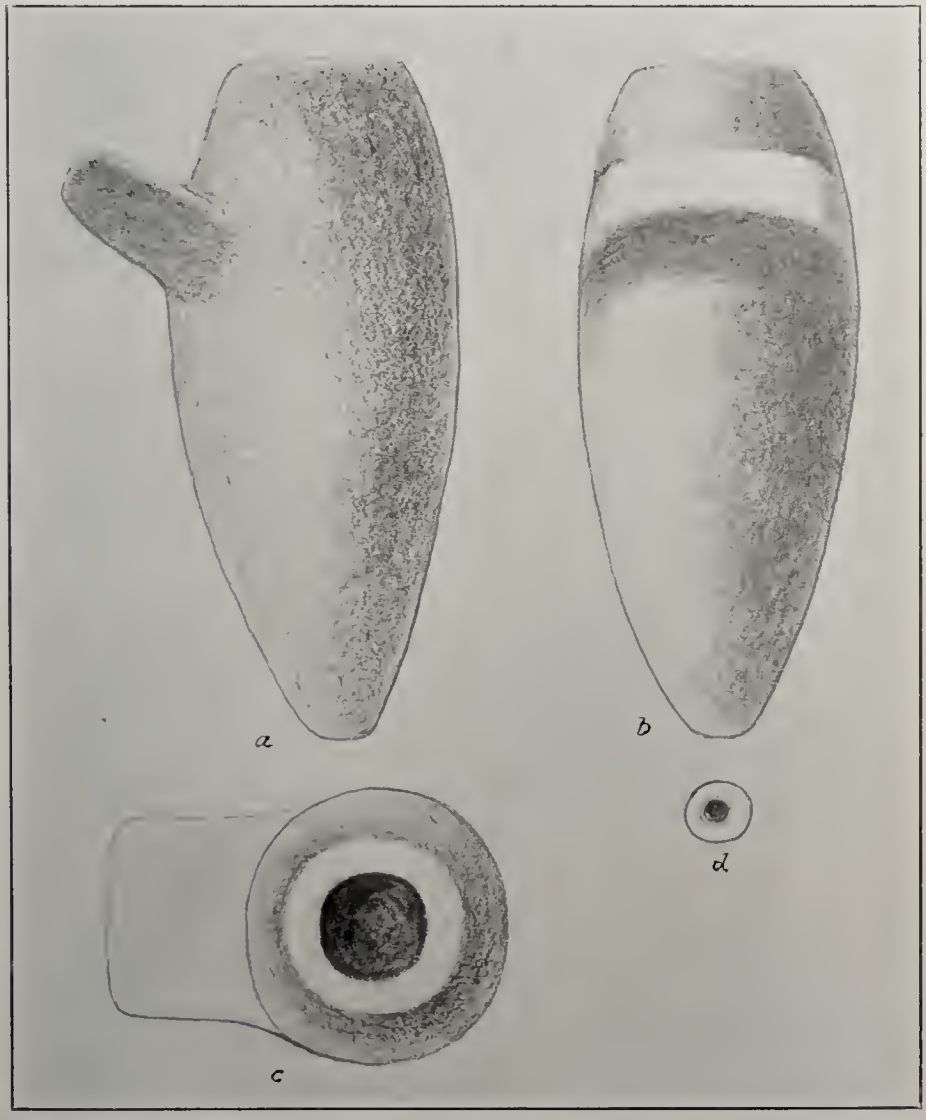
FOR EXPLANATION OF PLATE SEE PAGE 8.

a

b

WHITE MOUNTAIN APACHE INDIAN RESERVATION

FOR EXPLANATION OF PLATE SEE PAGES 11, 13.



SOAPSTONE PIPE FROM WHITE MOUNTAIN APACHE INDIAN RESERVATION

FOR EXPLANATION OF PLATE SEE PAGE 14.

a

b

c

WHITE MOUNTAIN APACHE INDIAN RESERVATION

FOR EXPLANATION OF PLATE SEE PAGE 20.

EXPLANATION OF PLATES

Plate 1

White Mountain Apache Indian Reservation

a, Surface ruins. *b*, View of great ruin. *c*, Nearer view showing walls.

Plate 2

White Mountain Apache Indian Reservation

a, Retaining wall to support house mass. *b*, Retaining wall to prevent earth slipping.

Plate 3

White Mountain Apache Indian Reservation

a, View of canyon above cliff house. *b*, View of cliff house across canyon.

Plate 4

White Mountain Apache Indian Reservation

a, Chinked wall and doorway; abutting wall of later building (left). *b*, Doorway at ground level with steps.

Plate 5

White Mountain Apache Indian Reservation

a, Fragment of a mud partition strengthened with cedar splints. *b*, Upper room showing fire place, mealing stones, and plastered walls. Cliff house.

Plate 6

White Mountain Apache Indian Reservation

a, Interior room of cliff house with bowed wall. *b*, Doorway in masonry wall of a room.

Plate 7

White Mountain Apache Indian Reservation

Hafted stone blade. Cliff house.

Plate 8

White Mountain Apache Indian Reservation

a, Superior masonry of room in first ward of great pueblo. *b*, Later crude masonry in room partition.

Plate 9

White Mountain Apache Indian Reservation

Soapstone pipe from Oak Creek Cave. *a*, Profile. *b*, Front view and mouth orifice. *c*, View from above. *d*, Mouth opening.

Plate 10

White Mountain Apache Indian Reservation

a, Square pit kiva. Interior Sawmill. Apache Reservation. *b*, Apache house, Oak Creek. *c*, Apaches under a ramada or arbor. Oak Creek.

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